CLAIMS

1 - Method for immunity to resource variations of a portable object comprising a processor unit, at least two contact and/or contactless interfaces for communication and/or input, said method comprising at least:

- one step of checking the availability status of at least one resource on one of the interfaces and a step of selecting resource(s),

characterised in that the method comprises the following steps, wherein:

- an interruption signal is generated towards the processor unit when there is a variation of resource availability,

and in that the processor processes the interruption signal to enable a selection of resources.

2 - Method according to claim 1, characterised in that an interruption signal is generated by a resource controller according to availability status transitions of at least one resource.

3 - Method according to claim 1 or 2, characterised in that the interruption signal is generated for the following transitions:

- transition (13.17; 14.18) from a weak input state via the contact interface to an input state via the contactless interface (3), the voltage of the latter interface (3) being higher than a threshold voltage;

- transition (17.13; 18.14) from an input state via the contactless interface (3) to a state of suspension of this input, the voltage received by the contactless interface (3) being lower than a threshold voltage;

- transition (15.16) from an input state via the contactless interface (3) to an input state via the contact interface (7);

- transition (16.16) or reset sequence (MaZ) controlled by the contact interface (7), with input via the contact interface (7).

4 - Method according to one of the claims 2 or 3, characterised in that, during the transition (17.13; 18.14) from input via the contactless interface (3) to the suspension of this input, the interruption takes place when the voltage received by the contactless interface (3) is lower than a critical threshold voltage and, at the same time, the chip (6) is placed in standby.

5 - Method according to claim 4, characterised in that the critical threshold voltage value is predetermined so as to allow a transfer with no risk of complete suspension of the input to the chip (6), for example, the value of this threshold value being slightly higher than a minimum operating voltage of the chip (6).

6 - Method according to one of the claims from 1 to 5, characterised in that the method comprises at least one immediate warning step, for entirely simultaneous management of power and/or clock resources (VCC; VDD; CLK).

7 - Method according to claim 6, characterised in that the immediate warning step includes a phase of switching the resources so that they are at least partially consumed via the contactless interface (3).

8 - Method according to claim 6 or 7, characterised in that the immediate warning step includes a phase of switching the resources so that they are at least partially consumed via the contact interface (7).

9 - Method according to one of the claims from 1 to 8, characterised in that the method includes at least one step of maintaining the transaction, with at least one delay and/or reset simulation phase, ordered by the contact interface (7) during a transition that aims to restart (MaZ) the chip (6) when switching resources.

10 - Method according to claim 9, characterised in that a delay phase during which the execution of instructions coming from the chosen code generates, for example, a delay command by sending a single byte of a common response command ("ATR") when activating the reset.

11 - Method according to claim 10, characterised in that the delay command with resumption of functions is issued at the end of a predefined number of clock cycles.

12 - Method according to one of the claims from 1 to 11, characterised in that the method includes at least one logical phase forming a standby controller in order for the chip (6) to conform to constraints of low consumption during standby states (13; 14; 17; 18).

13 - Method according to claim 12, characterised in that this logical phase forming a standby controller provides for the contact interface (7) to consume less than 200 pA in light standby states (13; 17), and to consume less than 100 pA in deep standby states (14; 18).

14 - Method according to one of the claims from 1 to 13, characterised in that the contactless interface (3) complies with ISO/IEC 14443.

15 - Method according to one of the claims from 1 to 14, characterised in that the contact interface complies with ISO 7816.

16 - Method according to one of the preceding claims, characterised in that this object is capable of securing an electronic terminal for data transmission and of communicating with the latter by means of the contact interface, and in that the method comprises a dual interface operating state wherein the contact and contactless interfaces operate at the same time, and at least one state-to-state transition causing at least one of the resources to vary, a variation which is capable of depriving the chip of energy.

17 - Device for immunity to resource variations of a portable object comprising a processor unit, at least two contact or contactless interfaces for communication and/or input, said device comprising at least means of checking the availability status of at least one resource on one of the interfaces and of selecting the resource(s), characterised in that the device is capable of generating an interruption signal sent to the processor unit when there is a variation of resource availability, and in that the processor is capable of processing the interruption to enable a selection of resources.

18 - Device according to claim 17, characterised in that it comprises immunity means (103) comprising a diode 20 for limiting the power consumed by the contactless interface 3, and a logic gate 21 providing switching between two power consumption modes (via a contact interface 7 or via a contactless interface 3).

19 - Device according to claim 17 or 18, characterised in that the immunity means (103) comprise at least one wired mechanism (M1) capable of detecting the presence of a power resource coming from the contact interface (7) and coming from the contactless interface (3), this mechanism (M1)

having at least two registers (R1; R2) by means of which the immunity means (103) provide information on the state (Active/Stopped) of the power supply resources (VCC; VDD), so that any modification of these registers (R1 and I or R2) produces a warning signal, for example, in the form of an interruption, a wire connecting the mechanism (M1) to a processor unit (108), so that the immunity means (103), after having consulted the registers (R1; R2), can then select the power source to be used.

20 - Device according to claim 19, characterised in that the immunity means (103) comprise a wired mechanism (M2) present in the chip (6) which guarantees that the selected source supplies electric power to the chip (6).

21 - Device according to one of the claims from 17 to 20, characterised in that the immunity means (103) comprise at least one functional block (107) forming an input controller, which detects the appearance and/or disappearance of resources.

22 - Device according to one of the claims from 17 to 21, characterised in that the immunity means (103) comprise means for entirely simultaneous management of the power and/or clock and/or timer resources (VCC; VDD; CLK).

23 - Device according to one of the claims from 17 to 22, characterised in that it comprises immediate warning means (102), for entirely simultaneous management of power and/or clock resources (VCC; VDD; CLK).

24 - Device according to claim 23, characterised in that the immediate warning means (102) include at least one functional block (103; 107) making it possible to switch between resources so they can be at least partially consumed via the contactless interface (3).

25 - Device according to one of the claims from 17 to 24, characterised in that this device includes means (101) of maintaining the transaction, with at least one delay and/or reset simulation phase, ordered by the contact interface (7) during a transition that aims to restart (MaZ) the chip (6) when switching resources.

26 - Device according to claim 25, characterised in that this functional block (107) comprises wires or similar elements for supplying the chip (6) with the suitable voltage and current and for informing this chip (6) of the appearance and/or disappearance of the contact (7) and/or contactless (3) interfaces.

27 - Device according to claim 25 or 26, characterised in that this device comprises a functional block (106) forming a standby controller, in order for the chip (6) to conform to constraints of low consumption during standby states (13; 14; 17; 18).

28 - Device according to claim 27, characterised in that this functional unit (106) forming a standby controller configures the power supply from the contact interface, (7) less than 200 pA in light standby states (13; 17) and less than 100 pA in deep standby states (14; 18).

29 - Transmission terminal (2) comprising at least one galvanic contact connection with an intelligent portable object (1) with dual interface, with a contact interface (7) allowing the object (1) to secure this terminal (2), the object (1) being equipped with a chip (6) and being capable of communicating with the terminal (2) via the contact interface (7) according to ISO 7816.3, the object (1) also being equipped with a contactless interface (3) communicating according to another contactless standard,

characterised in that this terminal (2) is capable of participating in the implementation of the method according to one of the claims from 1 to 16 and/or of receiving the object (1) comprising the device according to one of the claims from 17 to 28.

30 - Terminal (2) according to claim 29, characterised in that this terminal (2) forms a mobile telephone (e.g.: GSM, 3GPP, UMTS, CDMA, etc.) and / or a personal digital assistant (e.g.: PDA), and / or a set-top box and / or a computer.

31 - Intelligent portable object (1) capable of participating in the implementation of the method according to one of the claims from 1 to 16 and/or of comprising a device according to one of the claims from 17 to 28 and/or of being connected to a terminal according to one of the claims 29 or 30;

characterised in that this object (1) has a dual interface and is equipped with a chip (6), this object (1) being capable of communicating with at least one electronic terminal (2) for transmitting data via a contact interface (7) according to ISO 7816.3, or in a contactless manner via a contactless interface (3) according to another contactless standard, this method allowing the terminal (2) to be secured by the object (1) via the contact interface (7).

32 - Object (1) according to claim 31, characterised in that this object (1) is a chip card, an electronic ticket, a dongle or a module such as for proximity (e.g.: NFC) or semi-proximity communication (e.g.: Bluetooth).

33 - Object (1) according to one of the claims 31 or 32, characterised in that this object (1) comprises an energy source on-board the object (1), such as a solar panel or an

accumulator, providing means for replacing the energy resources coming from the contact (7) or contactless (3) interfaces.